Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AEROSPACE MATERIAL SPECIFICATION

AMS 5528B
Superseding AMS 5528A
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STEEL SHEET, STRIP, AND PLATE, CORROSION RESISTANT
17Cr - 7.1Ni - 1.1Al

1. SCOPE:

1.1 Form: This specification covers a corrosion resistant, precipitation-hardenable steel in the form of sheet, strip, and plate.

1.2 Application: Primarily for parts requiring corrosion resistance and high strength up to 600 F (316 C), and where such parts may require welding during fabrication.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York 10001.

2.1.1 Aerospace Material Specifications:

AMS 2242 - Tolerances, Corrosion and Heat Resistant Steel and Iron Base Alloy Sheet, Strip, and Plate and Titanium and Titanium Alloy Sheet, Strip, and Plate
AMS 2248 - Chemical Check Analysis Limits, Wrought Heat and Corrosion Resistant Steels and Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Alloys, Wrought Products Except Forgings

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM A370 - Mechanical Testing of Steel Products
ASTM E353 - Chemical Analysis of Stainless, Heat Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, Pennsylvania 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approval analytical methods:

	min	max
Carbon	--	0.09
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00	18.00
Nickel	6.50	7.75
Aluminum	0.75	1.50

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

3.2 Condition: The product shall be supplied in the following condition:

3.2.1 Sheet: Cold rolled, solution heat treated, and descaled (No. 2D Finish).

3.2.2 Strip: Cold rolled, solution heat treated, and descaled (No. 1 Strip Finish).

3.2.3 Plate: Hot rolled, solution heat treated, and descaled.

3.3 Solution Heat Treatment: The product shall be solution heat treated by heating to 1950 F ± 25 (1065.6 C ± 14), holding at heat for a time commensurate with the thickness and the heating equipment and procedure used, and cooling in air.

3.4 Properties: The product shall conform to the following requirements; tensile, hardness, and bend testing shall be performed in accordance with ASTM A370:

3.4.1 As Solution Heat Treated:

3.4.1.1 Tensile Properties:

TABLE I

Nominal Thickness Inch	Tensile Strength psi, max	Yield Strength at 0.2% Offset psi, max	Elongation in 2 in. or 4D %, min
0.005 to 0.010, incl	150,000	65,000	20
Over 0.010	150,000	55,000	20

TABLE I (SI)

Nominal Thickness Millimeters	Tensile Strength MN/m^2, max	Yield Strength at 0.2% Offset MN/m^2, max	Elongation in 50.8 mm or 4D %, min
0.127 to 0.254, incl	1034	448	20
Over 0.254	1034	379	20

3.4.1.2 Hardness: Shall be not higher than 92 HRB or equivalent.

3.4.1.3 Bending: The product shall withstand, without cracking, bending through the angle shown in Table II around a diameter equal to the bend factor times the nominal thickness of the material with axis of bend parallel to the direction of rolling:

TABLE II

Nominal Thickness Inch	Type of Bend	Angle deg, min	Bend Factor
Up to 0.187, incl	Free Bend	180	1
	V-Block	135	1
Over 0.187 to 0.275, incl	Free Bend	180	3
	V-Block	135	3

TABLE II (SI)

Nominal Thickness Millimeters	Type of Bend	Angle rad, min	Bend Factor
Up to 4.650, incl	Free Bend	3.14	1
	V-Block	2.36	1
Over 4.650 to 6.985, incl	Free Bend	3.14	3
	V-Block	2.36	3

3.4.2 As Austenite Conditioned and Precipitation Heat Treated: Product shall be austenite-conditioned by heating to 1400 F ± 25 (760 C ± 14), holding at heat for 90 min. ± 5, cooling to 55 F ± 5 (12.8 C ± 2.8) within 1 hr, holding at that temperature for not less than 30 min., and then precipitation heat treated by heating to 1050 F ± 10 (565.6 C ± 5.6), holding at heat for 90 min. ± 5, and cooling to room temperature.

3.4.2.1 Product 0.005 to 1.000 In. (0.127 to 25.400 mm), Incl, in Thickness:

3.4.2.1.1 Tensile Properties:

Tensile Strength	180,000 - 210,000 psi (1241 - 1448 MN/m^2)
Yield Strength at 0.2% Offset, min	150,000 psi (1034 MN/m^2)
Elongation in 2 in. (50.8 mm), min	

Nominal Thickness Inch	(Millimeters)	
0.005 to 0.010, incl	(0.127 to 0.254, incl)	4%
Over 0.010 to 0.019, incl	(Over 0.254 to 0.483, incl)	5%
Over 0.019 to 1.000, incl	(Over 0.483 to 25.400, incl)	6%

3.4.2.1.2 Hardness: Shall be 38 - 46 HRC or equivalent.

3.4.2.2 Product Over 1.000 In. (25.4 mm) in Thickness: Shall be as agreed upon by purchaser and vendor.

3.5 Quality: The product shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

3.6 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2241.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as routine control tests.

4.3 Sampling: Shall be in accordance with AMS 2371 and the following:

4.3.1 Tensile test specimens from widths 9 in. (229 mm) and over shall be taken with the axis of the specimen perpendicular to the direction of rolling; for widths less than 9 in. (229 mm), tensile test specimens shall be taken with the axis parallel to the direction of rolling.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and the results of tests on each thickness from each heat to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, heat number, material specification number and its revision letter, thickness, size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each sheet, strip, and plate shall be marked, in the respective location indicated below, with AMS 5528B, heat number, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance and shall be sufficiently stable to withstand normal handling.

5.1.1 Flat Strip 6 In (152 mm) and Under in Width: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm).

5.1.2 Flat Sheet Flat Strip Over 6 in. (152 mm) in Width, and Plate: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm) and spaced not more than 6 in. (152 mm) apart.

5.1.3 Coiled Sheet and Strip: Shall be marked near the outside end of the coil. The inside end of the coil shall also be marked or shall have a tag or label attached and marked with the information of 5.1.

5.2 Packaging: The product shall be prepared for shipment in accordance with commercial practice to assure carrier acceptance and safe transportation to the point of delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.